MCF 3M Opener

Factor

a) $x^2 - 9x + 20$

b) $4s^2 - 32s + 16$

c) $3r^2 - 12$

Sep 29-8:20 AM

Opener
Review of Ch 2 Skills

1) Expand
$(2x-1)(3x + 2)$

2) $9(x-2)^2$

Simplify
3) $4x^2 + 4x - 48$

4) $16x^2 - 72x + 81$

Sep 29-7:33 AM

MCF 3M Opener

Factor

A | M
-9 | +20

a) $x^2 - 9x + 20$
$x^2 - 5x - 4x + 20$
$x(x-5) - 4(x-5)$
$(x-5)(x-4)$

b) $4s^2 - 32s + 16$
$4(s^2 - 8s + 4)$

s 2 (2)

c) $3r^2 - 12$
$3(r^2 - 4)$
$3(r-2)(r+2)$

Sep 29-8:20 AM

Opener
Review of Ch 2 Skills

1) Expand
$(2x-1)(3x + 2)$
$6x^2 + 4x - 3x - 2$
$6x^2 + x - 2$

2) $9(x-2)^2$
$9(x-2)(x-2)$
$9(x^2 - 4x + 4)$
$9x^2 - 36x + 36$

Simplify
3) $4x^2 + 4x - 48$
$4(x^2 + x - 12)$ A | M
+1 | -12
4 -3
$4(x^2 + 4x - 3x - 12)$
$4[x(x+4) - 3(x+4)]$
$4(x+4)(x-3)$

4) $16x^2 - 72x + 81$
$\sqrt{16x^2}$ $\sqrt{81}$
$(4x)(9) \times 2 = 72x$
$(4x - 9)^2$

Sep 29-7:33 AM

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Relating the Standard and Factored Form

Example #1

Mar 2-1:33 PM

LEARN ABOUT the Math

To raise money, some students sell T-shirts. Based on last year's sales, they know that

- they can sell 40 T-shirts a week at $10 each
- if they raise the price by $1, they will sell one less T-shirt each week

They picked some prices, estimated the number of shirts they might sell, and calculated the revenue.

Price ($)	T-shirts Sold	Revenue ($)
10	40	10 × 40 = 400
10 + 15 = 25	40 − 15 = 25	25 × 25 = 625
10 + 30 = 40	40 − 30 = 10	40 × 10 = 400

Rachel and Andrew noticed that as they increased the price, the revenue increased and then decreased. Based on this pattern, they suggested quadratic functions to model revenue, where x is the number of $1 increases.

Sep 26-7:38 AM

- Rachel's function is $R(x) = (40 - x)(10 + x)$.
- Andrew's function is $R(x) = -x^2 + 30x + 400$.

What is the maximum revenue they can earn on T-shirt sales?

Sep 26-7:38 AM

p 132 & 133

Relating the Standard and Factored Form

Example #1

Tshirts → \$10 ea - sell 40

Revenue = Price × Total # of Tshirts

= \$10 × 40

= \$400

Pattern

↑ Price \$1 : ↓ Sales by 1 Tshirt

$R(t) = (10 + 1t)(40 - 1t)$ Factored form

Convert $= (10 + t)(40 - t)$

$R(t) = 400 - 10t + 40t - t^2$

$= -t^2 + 30t + 400$ standard form

Mar 2-1:33 PM

Off Graph

(15, 625)

Price # of Tshirts Sold

$R(t) = (10 + 1t)(40 - 1t)$

$R(t) = (10 + 1(15))(40 - 1(15))$ = change the price 15 x

R(15)

$= (10 + 15)(40 - 15)$

$R(15) = (25)(25)$

$R(15) = 625$

If they sell Tshirts for \$25 ea they will sell 25 t-shirts per week and bring in a max revenue of \$625.

Sep 25-8:52 AM

$R(t) = (10 + t)(40 - t)$

$R(t) = -t^2 + 30t + 400$

-10, +40

s t

What is max revenue?

$X_{vertex} = \frac{s + t}{2}$

$= \frac{-10 + 40}{2}$

$= \frac{30}{2}$

$X_v = 15$

$R(t) = (10 + t)(40 - t)$

$= (10 + 15)(40 - 15)$

$= (25)(25)$

new price 625 # of Tshirts \$25

(15, 625)

Mar 2-1:57 PM

(15, 625)

When the price increased by 15 (\$1) you will make a max revenue of \$1625.00.

Mar 2-2:04 PM

p135

$f(x) = 2x^2 - 5x - 12$

$= 2x^2 - 8x + 3x - 12$

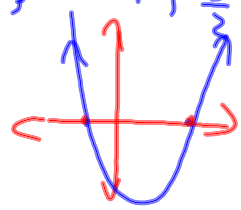
$= 2x(x - 4) + 3(x - 4)$

$= (x - 4)(\boxed{2}x + 3)$ Factored Form

A	M
-5	-24

-8 +3

s, r = 4, $-\frac{3}{2}$



a = +2

Mar 2-2:09 PM

$x_v = \frac{s+t}{2}$

$= \frac{4 + -\frac{3}{2}}{2}$

$= \frac{4 - 1.5}{2}$

$= \frac{2.5}{2}$

$x_v = 1.25$

Mar 2-2:15 PM

$f(x) = 2x^2 - 5x - 12$

$= 2(1.25)^2 - 5(1.25) - 12$

$= 2(1.5625) - 6.25 - 12$

$= 3.125 - 18.25$

$f(x) = -15.125$ $f(1.25) = -15.125$

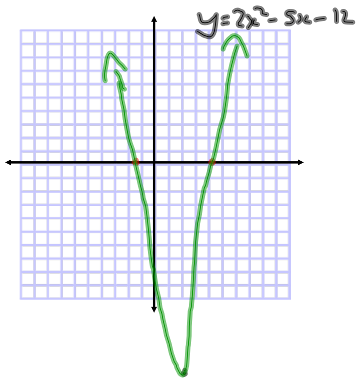
h k

$(1.25, -15.125)$

s t, 4 $-\frac{3}{2}$

$(4,0)(-\frac{3}{2},0)$

Mar 2-2:17 PM



Mar 2-2:20 PM

EXAMPLE 3 Solving problems using a quadratic function model

The height of a football kicked from the ground is given by the function $h(t) = -5t^2 + 20t$, where $h(t)$ is the height in metres and t is the time in seconds from its release.

a) Write the function in factored form.
b) When will the football hit the ground?
c) When will the football reach its maximum height?
d) What is the maximum height the football reaches?
e) Graph the height of the football in terms of time without using a table of values.

Sep 27-7:35 AM

Football

Height of a football is modelled by

$h(t) = -5t^2 + 20t$

When does the football hit the ground? zeros

Find the maximum height of the football?

$y_{vertex} = K$

$h(t) = -5t(t-4)$

$s = 0$ $t = 4$

The football hits the ground at 4 sec

Mar 2-2:23 PM

$x_v = \frac{s+t}{2}$

$= \frac{0+4}{2}$

$= \frac{4}{2}$

$= 2$

$h(t) = -5t^2 + 20t$

Substitute

$h(t) = -5(2)^2 + 20(2)$

$h(2) = -5(4) + 40$

$h(2) = -20 + 40$

$y_v = 20$

The ball reaches a maximum height of 20m at 2 sec.

Mar 2-2:29 PM

p 139-142

q.2,4, 6,.7, 9, 11, 12
&14

2,4,6,7 & 9
odds
a, c, e ...

Mar 2-2:32 PM

Q2 = $f(x) = 2x^2 + 12x$ standard

$f(x = 2x(x+6)$ factored

0 $\quad$ -6

sketch 0, -6

x_v $\frac{0+-6}{2}$

$= \frac{-6}{2}$

$= -3$

$x = -3$

y vertex sub x_{ver} (-3)

$f(x) = 2(-3)^2 + 12(-3)$

$= 2(9) - 36$

$= 18 - 36$

$= -18$

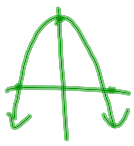
Mar 2-2:40 PM

$f(x) = -x^2 + 100$

$= -(x^2 - 100)$

$f(x) = -(x+10)(x-10)$

-10 $\quad$ $+10$



x_{vert} $\frac{-10+10}{2}$

$= \frac{0}{2}$

$= 0$

sub $x = 0$

$f(x) = -(0)^2 + 100$

$= 0 + 100$

$= 100$

Mar 2-2:45 PM